

Borehole

21-08-02**Log Event A****Borehole Information**

Farm : <u>BX</u>	Tank : <u>BX-108</u>	Site Number : <u>299-E33-64</u>
N-Coord : <u>45,537</u>	W-Coord : <u>53,412</u>	TOC Elevation : <u>658.43</u>
Water Level, ft :	Date Drilled : <u>11/30/1947</u>	

Casing Record

Type : <u>Steel-welded</u>	Thickness, in. : <u>0.313</u>	ID, in. : <u>8</u>
Top Depth, ft. : <u>0</u>	Bottom Depth, ft. : <u>150</u>	

Borehole Notes:

Borehole 21-08-02 was drilled in November 1947 and completed to a depth of 150 ft with 8-in.-diameter casing. The driller's log reports that the casing was perforated in March 1948 from 40 to 100 ft with a staggered pattern of five holes per foot. There is no mention of grouting, and it is assumed that there is no grout plug in the bottom of the borehole.

The top of the casing is the zero reference for the log and is about 0.5 ft below ground surface. The borehole depth, as measured with a weighted tape, was 129.5 ft. No explanation was available to explain why the borehole is partially filled.

Equipment Information

Logging System : <u>2</u>	Detector Type : <u>HPGe</u>	Detector Efficiency: <u>35.0 %</u>
Calibration Date : <u>04/1997</u>	Calibration Reference : <u>GJO-HAN-14</u>	Logging Procedure : <u>P-GJPO-1783</u>

Log Run Information

Log Run Number : <u>1</u>	Log Run Date : <u>08/08/1997</u>	Logging Engineer: <u>Bob Spatz</u>
Start Depth, ft.: <u>0.0</u>	Counting Time, sec.: <u>100</u>	L/R : <u>L</u> Shield : <u>N</u>
Finish Depth, ft. : <u>24.5</u>	MSA Interval, ft. : <u>0.5</u>	Log Speed, ft/min.: <u>n/a</u>

Log Run Number : <u>2</u>	Log Run Date : <u>08/11/1997</u>	Logging Engineer: <u>Bob Spatz</u>
Start Depth, ft.: <u>129.0</u>	Counting Time, sec.: <u>100</u>	L/R : <u>L</u> Shield : <u>N</u>
Finish Depth, ft. : <u>73.0</u>	MSA Interval, ft. : <u>0.5</u>	Log Speed, ft/min.: <u>n/a</u>

Log Run Number : <u>3</u>	Log Run Date : <u>08/12/1997</u>	Logging Engineer: <u>Bob Spatz</u>
Start Depth, ft.: <u>74.0</u>	Counting Time, sec.: <u>100</u>	L/R : <u>L</u> Shield : <u>N</u>
Finish Depth, ft. : <u>23.5</u>	MSA Interval, ft. : <u>0.5</u>	Log Speed, ft/min.: <u>n/a</u>

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21-08-02**Log Event A**

Log Run Number :	<u>4</u>	Log Run Date :	<u>08/12/1997</u>	Logging Engineer:	<u>Bob Spatz</u>
Start Depth, ft.:	<u>55.0</u>	Counting Time, sec.:	<u>100</u>	L/R : <u>L</u>	Shield : <u>N</u>
Finish Depth, ft. :	<u>35.0</u>	MSA Interval, ft. :	<u>0.5</u>	Log Speed, ft/min.:	<u>n/a</u>

Analysis Information

Analyst : D.L. ParkerData Processing Reference : MAC-VZCP 1.7.9Analysis Date : 12/10/1997

Analysis Notes :

This borehole was logged by the SGLS in four log runs, with one relog of a previously logged segment of the borehole. The pre-survey and post-survey field verification spectra for all logging runs met the acceptance criteria established for peak shape and system efficiency. The energy calibration and peak-shape calibration from these spectra were used to establish the peak resolution and channel-to-energy parameters used in processing the spectra acquired during the logging operation.

Casing correction factors for a 0.330-in.-thick steel casing were applied during analysis.

The only man-made radionuclide detected in this borehole was Cs-137. The Cs-137 contamination was detected continuously from the ground surface to 11 ft and intermittently from 41 to 99.5 ft. Two well-defined peaks in the Cs-137 concentrations were detected at 1 and 8.5 ft.

Shape factor analysis was performed. The shape factors provide insights into the distribution of the Cs-137 contamination and into the nature of zones of elevated total count gamma-ray activity not attributable to gamma-emitting radionuclides.

The K-40 concentration values increase from 39 to 42.5 ft and remain elevated to the bottom of the logged interval. The U-238 concentration values are absent between 7 and 10 ft and are elevated between 10.5 and 15 ft.

Additional information and interpretations of log data are included in the main body of the Tank Summary Data Report for tank BX-108.

Log Plot Notes:

Separate log plots show the man-made and the naturally occurring radionuclides. The natural radionuclides can be used for lithology interpretations. The headings of the plots identify the specific gamma rays used to calculate the concentrations. Uncertainty bars on the plots show the statistical uncertainties for the measurements as 95-percent confidence intervals. Open circles on the plots give the MDL. The MDL of a radionuclide represents the lowest concentration at which positive identification of a gamma-ray peak is statistically defensible.

A combination plot includes the man-made and natural radionuclides, the total gamma derived from the spectral data, and the Tank Farms gross gamma log. The gross gamma plot displays the latest available digital data. No attempt has been made to adjust the depths of the gross gamma logs to coincide with the SGLS data.



Spectral Gamma-Ray Borehole Log Data Report

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The interval between 35 and 55 ft was relogged as a quality assurance measure to establish the repeatability of the radionuclide concentration measurements. The radionuclide concentrations shown were calculated using separate data sets provided by the original and rerun logging runs.

Plots of the spectrum shape factors are included. The plots are used as an interpretive tool to help determine the radial distribution of man-made contaminants around the borehole.

A plot of the selected historical gross gamma logs is included.